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(54) Title: HERBICIDAL COMPOSITION

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(57) Abstract: A herbicidal composition comprising as active ingredient a mixture of a) at least one compound selected from tritosulfuron, flufenacet and propoxycarbazone (sodium), and b) a synergistically effective amount of at least one compound selected from the compounds of the group amidosulfuron, bentazone, bifenox, diflufenican, dicamba, dimethenamid, flurtamone, glufosinate, fenoxaprop-P-ethyl, iodosulfuron-methyl (sodium), bromoxynil, ioxynil, beflobutamid, imazosulfuron, cinidon-ethyl, 2,4-D, MCPA, MCPP, picolinafen, pendimethalin, pyraflufen, imazethapyr, imazapic, imazapir, imazaquin, imazamox and imazamethabenz-methyl, with the proviso that the mixtures of tritosulfuron with beflobutamid, tritosulfuron with mesosulfuron, tritosulfuron with iodosulfuron-methyl (sodium), tritosulfuron with ioxynil, tritosulfuron with dicamba, tritosulfuron with cinidon-ethyl, tritosulfuron with 2,4-D, picolinafen with cinidon-ethyl, flufenacet with picolinafen, flufenacet with fenoxaprop-P-ethyl, flufenacet with iodosulfuron-methyl (sodium), flufenacet with beflobutamid, flufenacet with mesosulfuron, flufenacet with cinidon-ethyl, flufenacet with imazamox, flufenacet with bifenox, flufenacet with diflufenican, flufenacet with flurtamone, flufenacet with glufosinate, flufenacet with pendimethalin, flufenacet with ioxynil, propoxycarbazone (sodium) with amidosulfuron, propoxycarbazone (sodium) with diflufenican, propoxycarbazone (sodium) with fenoxaprop-P-ethyl, propoxycarbazone (sodium) with iodosulfuron-methyl (sodium), propoxycarbazone (sodium) with bromoxynil, propoxycarbazone (sodium) with ioxynil, propoxycarbazone (sodium) with mesosulfuron, propoxycarbazone (sodium) with bifenox, propoxycarbazone (sodium) with flurtamone, propoxycarbazone (sodium) with picolinafen and propoxycarbazone (sodium) with glufosinate are excluded.

Herbicidal composition

The present invention relates to a novel herbicidal synergistic composition comprising a herbicidal active ingredient combination that is suitable for the selective control of weeds in crops of useful plants, for example in crops of cereals.

The invention relates also to a method of controlling weeds in crops of useful plants and to the use of the novel composition for that purpose.

The compounds amidosulfuron, bentazone, bifenoxy, diflufenican, dicamba, flufenacet, dimethenamid, flurtamone, glufosinate, fenoxaprop-P-ethyl, iodosulfuron-methyl (sodium), bromoxynil, ioxynil, beflubutamid, imazosulfuron, cinidon-ethyl, 2,4-D, MCPA, MCPP, picolinafen, pendimethalin, pyraflufen, imazethapyr, imazapic, imazapyr, imazaquin, imazamox and imazamethabenz-methyl exhibit herbicidal action, as is described, for example, in The Pesticide Manual, 12th Edition (BCPC), 2000. Propoxycarbazone (sodium) is known from BCPC lectures in Brighton in 1999. Tritosulfuron, registered as No. 142469-14-5 in CAS (Chemical Abstracts), is known from EP-A-559 814 and WO 01/24633, in which the herbicidal action of the compound is described. The compound 2-[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]-4-[[[(methylsulfonyl)amino]methyl]benzoic acid is known under the name mesosulfuron; its herbicidal action is described in EP-A-559 814 and WO 01/24633.

Surprisingly, it has now been found that a combination of variable amounts of at least two active ingredients from the above list exhibits a synergistic action that is capable of controlling, both pre-emergence and post-emergence, the majority of weeds occurring especially in crops of useful plants, without appreciably damaging the useful plant.

There is therefore proposed in accordance with the present invention a novel synergistic composition for the selective control of weeds, which comprises as active ingredient a mixture of

- a) at least one compound selected from tritosulfuron, flufenacet and propoxycarbazone (sodium), and
- b) a synergistically effective amount of at least one compound selected from the compounds of the group amidosulfuron, bentazone, bifenoxy, diflufenican, dicamba, dimethenamid, flurtamone, glufosinate, fenoxaprop-P-ethyl, iodosulfuron-methyl (sodium), bromoxynil, ioxynil, beflubutamid, imazosulfuron, cinidon-ethyl, 2,4-D, MCPA, MCPP, picolinafen, pendimethalin, pyraflufen, imazethapyr, imazapic, imazapyr, imazaquin,

imazamox and imazamethabenz-methyl, with the proviso that the mixtures of tritosulfuron with beflubutamid, tritosulfuron with mesosulfuron, tritosulfuron with iodosulfuron-methyl (sodium), tritosulfuron with ioxynil, tritosulfuron with dicamba, tritosulfuron with cinidon-ethyl, tritosulfuron with 2,4-D, picolinafen with cinidon-ethyl, flufenacet with picolinafen, flufenacet with fenoxaprop-P-ethyl, flufenacet with iodosulfuron-methyl (sodium), flufenacet with beflubutamid, flufenacet with mesosulfuron, flufenacet with cinidon-ethyl, flufenacet with imazamox, flufenacet with bifenox, flufenacet with diflufenican, flufenacet with flurtamone, flufenacet with glufosinate, flufenacet with pendimethalin, flufenacet with ioxynil, propoxycarbazone (sodium) with amidosulfuron, propoxycarbazone (sodium) with diflufenican, propoxycarbazone (sodium) with fenoxaprop-P-ethyl, propoxycarbazone (sodium) with iodosulfuron-methyl (sodium), propoxycarbazone (sodium) with bromoxynil, propoxycarbazone (sodium) with ioxynil, propoxycarbazone (sodium) with mesosulfuron, propoxycarbazone (sodium) with bifenox, propoxycarbazone (sodium) with flurtamone, propoxycarbazone (sodium) with picolinafen and propoxycarbazone (sodium) with glufosinate are excluded.

It is extremely surprising that combinations of the afore-mentioned active ingredients exceed the additive effect on the weeds to be controlled that is to be expected in principle and thus broaden the range of action of both active ingredients especially in two respects: firstly, the rates of application of the individual compounds are reduced while a good level of action is maintained and, secondly, the composition according to the invention achieves a high level of weed control also in those cases where the individual substances, in the low rates of application range, have become useless from the agronomic standpoint. The result is a considerable broadening of the spectrum of weeds and an additional increase in selectivity in respect of the crops of useful plants, as is necessary and desirable in the event of an unintentional overdose of active ingredient. The composition according to the invention, while retaining excellent control of weeds in crops of useful plants, also allows greater flexibility in succeeding crops.

The composition according to the invention can be used against a large number of agronomically important weeds, such as *Stellaria*, *Nasturtium*, *Agrostis*, *Digitaria*, *Avena*, *Setaria*, *Sinapis*, *Lolium*, *Solanum*, *Bromus*, *Apera*, *Alopecurus*, *Matricaria*, *Abutilon*, *Sida*, *Xanthium*, *Amaranthus*, *Chenopodium*, *Ipomoea*, *Chrysanthemum*, *Galium*, *Viola* and *Veronica*. The composition according to the invention is suitable for all methods of application conventionally used in agriculture, e.g. pre-emergence application, post-emergence application and seed dressing. The composition according to the invention is suitable especially for controlling weeds in crops of useful plants, such as cereals and

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maize, and very especially for controlling weeds in cereals. "Crops of useful plants" are to be understood to mean also those which have been made tolerant to herbicides or classes of herbicides as a result of conventional methods of breeding or genetic engineering methods.

The composition according to the invention comprises the mentioned active ingredients in any mixing ratio, but usually has an excess of one component over the other. Preferred mixing ratios of the active ingredients are from 100:1 to 1:100 and 50:1 to 1:50.

Very especially effective compositions have been found to be the combinations tritosulfuron with amidosulfuron, tritosulfuron with bentazone, tritosulfuron with bifenox, tritosulfuron with diflufenican, tritosulfuron with dimethenamid, tritosulfuron with fenoxaprop-P-ethyl, tritosulfuron with flurtamone, tritosulfuron with glufosinate, tritosulfuron with bromoxynil, tritosulfuron with imazosulfuron, tritosulfuron with pyraflufen, tritosulfuron with MCPA, tritosulfuron with MCPP, tritosulfuron with picolinafen, tritosulfuron with pendimethalin, tritosulfuron with imazethapyr, tritosulfuron with imazapic, tritosulfuron with imazapyr, tritosulfuron with imazaquin, tritosulfuron with imazamox, tritosulfuron with imazamethabenz-methyl, flufenacet with amidosulfuron, flufenacet with bentazone, flufenacet with dicamba, flufenacet with dimethenamid, flufenacet with bromoxynil, flufenacet with imazosulfuron, flufenacet with pyraflufen, flufenacet with 2,4-D, flufenacet with MCPA, flufenacet with MCPP, flufenacet with imazethapyr, flufenacet with imazapic, flufenacet with imazapyr, flufenacet with imazaquin, flufenacet with imazamethabenz-methyl, propoxycarbazone (sodium) with bentazone, propoxycarbazone (sodium) with dicamba, propoxycarbazone (sodium) with dimethenamid, propoxycarbazone (sodium) with beflubutamid, propoxycarbazone (sodium) with imazosulfuron, propoxycarbazone (sodium) with pyraflufen, propoxycarbazone (sodium) with cinidon-ethyl, propoxycarbazone (sodium) with 2,4-D, propoxycarbazone (sodium) with MCPA, propoxycarbazone (sodium) with MCPP, propoxycarbazone (sodium) with pendimethalin, propoxycarbazone (sodium) with imazethapyr, propoxycarbazone (sodium) with imazapic, propoxycarbazone (sodium) with imazapyr, propoxycarbazone (sodium) with imazaquin, propoxycarbazone (sodium) with imazamox, and propoxycarbazone (sodium) with imazamethabenz-methyl.

The rate of application may vary within wide limits and depends on the nature of the soil, the method of application (pre- or post-emergence; seed dressing; application to the seed furrow; no tillage application etc.), the crop plant, the weed to be controlled, the prevailing climatic conditions, and other factors governed by the method of application, the time of

application and the target crop. The active ingredient mixture according to the invention can generally be applied at a rate of from 0.001 to 1.5 kg of active ingredient mixture per ha.

The mixtures according to the invention may be used in unmodified form, that is to say as obtained in the synthesis. Preferably, however, they are formulated in customary manner, together with the adjuvants conventionally used in formulation technology, such as solvents, solid carriers or surfactants, for example into emulsifiable concentrates, directly sprayable or dilutable solutions, wettable powders, soluble powders, dusts, granules or microcapsules, as is described in WO 97/34483, pages 9 to 13. As with the nature of the compositions, the methods of application, such as spraying, atomising, dusting, wetting, scattering or pouring, are chosen in accordance with the intended objectives and the prevailing circumstances. The formulations, i.e. the compositions, preparations or products comprising the mixtures according to the invention, and also, where appropriate, one or more solid or liquid formulation adjuvants, are prepared in a manner known *per se*, e.g. by intimately mixing and/or grinding the active ingredients with the formulation adjuvants, e.g. solvents or solid carriers. In addition, surface-active compounds (surfactants) may also be used in the preparation of the formulations.

Examples of solvents and solid carriers are given, for example, in WO 97/34485, page 6. Depending on the nature of the active ingredients to be formulated, suitable surface-active compounds are non-ionic, cationic and/or anionic surfactants and surfactant mixtures having good emulsifying, dispersing and wetting properties. Examples of suitable anionic, non-ionic and cationic surfactants are listed, for example, in WO 97/34485, pages 7 and 8. Also suitable in the preparation of the herbicidal compositions according to the invention are the surfactants conventionally used in formulation technology, which are described, *inter alia*, in "McCutcheon's Detergents and Emulsifiers Annual" MC Publishing Corp., Ridgewood New Jersey, 1981, Stache, H., "Tensid-Taschenbuch", Carl Hanser Verlag, Munich/Vienna, 1981 and M. and J. Ash, "Encyclopedia of Surfactants", Vol I-III, Chemical Publishing Co., New York, 1980-81.

The herbicidal formulations usually contain from 0.1 to 99 % by weight, especially from 0.1 to 95 % by weight, of active ingredient mixture, from 1 to 99.9 % by weight of a solid or liquid formulation adjuvant, and from 0 to 25 % by weight, especially from 0.1 to 25 % by weight, of a surfactant.

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Whereas concentrates are usually preferred as commercial products, the end user will normally employ dilute formulations. The compositions may also comprise further ingredients, such as stabilisers, e.g. vegetable oils or epoxidised vegetable oils (epoxidised coconut oil, rapeseed oil or soybean oil), antifoams, e.g. silicone oil, preservatives, viscosity regulators, binders, tackifiers, and also fertilisers or other active ingredients. Preferred formulations have especially the following compositions:

(% = percent by weight)

Emulsifiable concentrates:

active ingredient mixture: 1 to 90 %, preferably from 5 to 20 %
surface-active agent: 1 to 30 %, preferably from 10 to 20 %
liquid carrier: 5 to 94 %, preferably from 70 to 85 %

Dusts:

active ingredient mixture: 0.1 to 10 %, preferably 0.1 to 5 %
solid carrier: 99.9 to 90 %, preferably 99.9 to 99 %

Suspension concentrates:

active ingredient mixture: 5 to 75 %, preferably from 10 to 50 %
water: 94 to 24 %, preferably from 88 to 30 %
surface-active agent: 1 to 40 %, preferably from 2 to 30 %

Wettable powders:

active ingredient mixture: 0.5 to 90 %, preferably from 1 to 80 %
surface-active agent: 0.5 to 20 %, preferably from 1 to 15 %
solid carrier: 5 to 95 %, preferably from 15 to 90 %

Granules:

active ingredient mixture: 0.1 to 30 %, preferably from 0.1 to 15 %
solid carrier: 99.5 to 70 %, preferably from 97 to 85 %

The Examples that follow illustrate the invention further. They do not limit the invention.

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F1. Emulsifiable concentrates

	a)	b)	c)	d)
active ingredient mixture	5 %	10 %	25 %	50 %
calcium dodecylbenzenesulfonate	6 %	8 %	6 %	8 %
castor oil polyglycol ether (36 mol of ethylene oxide)	4 %	-	4 %	4 %
octylphenol polyglycol ether (7-8 mol of ethylene oxide)	-	4 %	-	2 %
cyclohexanone	-	-	10 %	20 %
aromatic C ₉ -C ₁₂ hydrocarbon mixture	85 %	78 %	55 %	16 %

Emulsions of any desired concentration can be prepared from such concentrates by dilution with water.

F2. Solutions

	a)	b)	c)	d)
active ingredient mixture	5 %	10 %	50 %	90 %
1-methoxy-3-(3-methoxy-propoxy)-propane	-	20 %	20 %	-
polyethylene glycol (mol. wt. 400)	20 %	10 %	-	-
N-methyl-2-pyrrolidone	-	-	30 %	10 %
aromatic C ₉ -C ₁₂ hydrocarbon mixture	75 %	60 %	-	-

The solutions are suitable for application in the form of micro-drops.

F3. Wettable powders

	a)	b)	c)	d)
active ingredient mixture	5 %	25 %	50 %	80 %
sodium lignosulfonate	4 %	-	3 %	-
sodium lauryl sulfate	2 %	3 %	-	4 %
sodium diisobutylnaphthalenesulfonate	-	6 %	5 %	6 %
octylphenol polyglycol ether (7-8 mol of ethylene oxide)	-	1 %	2 %	-
highly dispersed silicic acid	1 %	3 %	5 %	10 %
kaolin	88 %	62 %	35 %	-

The active ingredient is mixed thoroughly with the adjuvants and the mixture is thoroughly ground in a suitable mill, affording wettable powders which can be diluted with water to give suspensions of any desired concentration.

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F4. Coated granules

	a)	b)	c)
active ingredient mixture	0.1 %	5 %	15 %
highly dispersed silicic acid	0.9 %	2 %	2 %
inorganic carrier material (diameter 0.1 - 1 mm)	99.0 %	93 %	83 %

for example CaCO_3 or SiO_2

The active ingredient is dissolved in methylene chloride, the solution is sprayed onto the carrier, and the solvent is subsequently evaporated off *in vacuo*.

F5. Coated granules

	a)	b)	c)
active ingredient mixture	0.1 %	5 %	15 %
polyethylene glycol (mol. wt. 200)	1.0 %	2 %	3 %
highly dispersed silicic acid	0.9 %	1 %	2 %
inorganic carrier material (diameter 0.1 - 1 mm)	98.0 %	92 %	80 %

for example CaCO_3 or SiO_2

The finely ground active ingredient is uniformly applied, in a mixer, to the carrier material moistened with polyethylene glycol, yielding non-dusty coated granules.

F6. Extruder granules

	a)	b)	c)	d)
active ingredient mixture	0.1 %	3 %	5 %	15 %
sodium lignosulfonate	1.5 %	2 %	3 %	4 %
carboxymethylcellulose	1.4 %	2 %	2 %	2 %
kaolin	97.0 %	93 %	90 %	79 %

The active ingredient is mixed with the adjuvants, and the mixture is ground, moistened with water, extruded and then dried in a stream of air.

F7. Dusts

	a)	b)	c)
active ingredient mixture	0.1 %	1 %	5 %
talcum	39.9 %	49 %	35 %
kaolin	60.0 %	50 %	60 %

Ready-to-use dusts are obtained by mixing the active ingredient with the carriers and grinding the mixture in a suitable mill.

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<u>F8. Suspension concentrates</u>	a)	b)	c)	d)
active ingredient mixture	3 %	10 %	25 %	50 %
ethylene glycol	5 %	5 %	5 %	5 %
nonylphenol polyglycol ether (15 mol of ethylene oxide)	-	1 %	2 %	-
sodium lignosulfonate	3 %	3 %	4 %	5 %
carboxymethylcellulose	1 %	1 %	1 %	1 %
37 % aqueous formaldehyde solution	0.2 %	0.2 %	0.2 %	0.2 %
silicone oil emulsion	0.8 %	0.8 %	0.8 %	0.8 %
water	87.0 %	79.0 %	62.0 %	38.0 %

The finely ground active ingredient is intimately mixed with the adjuvants, giving a suspension concentrate from which suspensions of any desired concentration can be obtained by dilution with water.

It is often more practical to formulate the active ingredients of the mixtures according to the invention separately and then, shortly before application, to bring them together in the applicator in the desired mixing ratio in the form of a "tank mixture" in water.

Biological Examples:

Example B1: Pre-emergence test:

The test plants are sown in pots under greenhouse conditions. A standard soil is used as cultivation substrate. At a pre-emergence stage, the herbicides, both on their own and in admixture, are applied to the surface of the soil. The rates of application depend on the optimum concentrations ascertained under field conditions or greenhouse conditions. The tests are evaluated after from 2 to 4 weeks (100 % action = plant is completely dead; 0 % action = no phytotoxic action). The mixtures used in this test show good results.

Example B2: Post-emergence test:

The test plants are grown in pots under greenhouse conditions until a post-application stage. A standard soil is used as cultivation substrate. At a post-emergence stage, the herbicides, both on their own and in admixture, are applied to the test plants. The rates of application depend on the optimum concentrations ascertained under field conditions or greenhouse conditions. The tests are evaluated after from 2 to 4 weeks (100 % action =

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plant is completely dead; 0 % action = no phytotoxic action). The mixtures used in this test show good results.

What is claimed is:

1. A herbicidal synergistic composition comprising as active ingredient a mixture of
 - a) at least one compound selected from tritosulfuron, flufenacet and propoxycarbazone (sodium), and
 - b) a synergistically effective amount of at least one compound selected from the compounds of the group amidosulfuron, bentazone, bifenoxy, diflufenican, dicamba, dimethenamid, flurtamone, glufosinate, fenoxaprop-P-ethyl, iodosulfuron-methyl (sodium), bromoxynil, ioxynil, beflubutamid, imazosulfuron, cinidon-ethyl, 2,4-D, MCPA, MCPP, picolinafen, pendimethalin, pyraflufen, imazethapyr, imazapic, imazapyr, imazaquin, imazamox and imazamethabenz-methyl, with the proviso that the mixtures of tritosulfuron with beflubutamid, tritosulfuron with mesosulfuron, tritosulfuron with iodosulfuron-methyl (sodium), tritosulfuron with ioxynil, tritosulfuron with dicamba, tritosulfuron with cinidon-ethyl, tritosulfuron with 2,4-D, picolinafen with cinidon-ethyl, flufenacet with picolinafen, flufenacet with fenoxaprop-P-ethyl, flufenacet with iodosulfuron-methyl (sodium), flufenacet with beflubutamid, flufenacet with mesosulfuron, flufenacet with cinidon-ethyl, flufenacet with imazamox, flufenacet with bifenoxy, flufenacet with diflufenican, flufenacet with flurtamone, flufenacet with glufosinate, flufenacet with pendimethalin, flufenacet with ioxynil, propoxycarbazone (sodium) with amidosulfuron, propoxycarbazone (sodium) with diflufenican, propoxycarbazone (sodium) with fenoxaprop-P-ethyl, propoxycarbazone (sodium) with iodosulfuron-methyl (sodium), propoxycarbazone (sodium) with bromoxynil, propoxycarbazone (sodium) with ioxynil, propoxycarbazone (sodium) with mesosulfuron, propoxycarbazone (sodium) with bifenoxy, propoxycarbazone (sodium) with flurtamone, propoxycarbazone (sodium) with picolinafen and propoxycarbazone (sodium) with glufosinate are excluded.
2. A method of controlling undesired plant growth in a crop of useful plants, which comprises allowing a herbicidally effective amount of a composition according to claim 1 to act on the crop plant or the area of cultivation thereof.
3. A method according to claim 2, wherein the crop plant is a cereal.

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(54) Title: HERBICIDAL COMPOSITION

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(57) Abstract: A herbicidal composition comprising as active ingredient a mixture of a) at least one compound selected from tritosulfuron, flufenacet and propoxycarbazone (sodium), and b) a synergistically effective amount of at least one compound selected from the compounds of the group amidosulfuron, bentazone, bifenox, diflufenican, dicamba, dimethenamid, flurtamone, glufosinate, fenoxaprop-P-ethyl, iodosulfuron-methyl (sodium), bromoxynil, ioxynil, beflubutamid, imazosulfuron, cinidon-ethyl, 2,4-D, MCPA, MCPP, picolinafen, pendimethalin, pyraflufen, imazapic, imazapyr, imazaquin, imazamox and imazamethabenz-methyl, with the proviso that the mixtures of tritosulfuron with beflubutamid, tritosulfuron with mesosulfuron, tritosulfuron with iodosulfuron-methyl (sodium), tritosulfuron with ioxynil, tritosulfuron with dicamba, tritosulfuron with cinidon-ethyl, tritosulfuron with 2,4-D, picolinafen with cinidon-ethyl, flufenacet with picolinafen, flufenacet with fenoxaprop-P-ethyl, flufenacet with iodosulfuron-methyl (sodium), flufenacet with beflubutamid, flufenacet with mesosulfuron, flufenacet with cinidon-ethyl, flufenacet with imazamox, flufenacet with bifenox, flufenacet with diflufenican, flufenacet with flurtamone, flufenacet with glufosinate, flufenacet with pendimethalin, flufenacet with ioxynil, propoxycarbazone (sodium) with amidosulfuron, propoxycarbazone (sodium) with diflufenican, propoxycarbazone (sodium) with fenoxaprop-P-ethyl, propoxycarbazone (sodium) with iodosulfuron-methyl (sodium), propoxycarbazone (sodium) with bromoxynil, propoxycarbazone (sodium) with ioxynil, propoxycarbazone (sodium) with mesosulfuron, propoxycarbazone (sodium) with bifenox, propoxycarbazone (sodium) with flurtamone, propoxycarbazone (sodium) with picolinafen and propoxycarbazone (sodium) with glufosinate are excluded.

INTERNATIONAL SEARCH REPORT

International	Classification No
PCT/EP 03/08791	

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A01N47/36 A01N43/82 A01N47/38
 //((A01N47/38,61:00),(A01N47/36,61:00),(A01N43/82,61:00))

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal, WPI Data, PAJ, BIOSIS, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 03/009684 A (BAYER CROP SCIENCE GMBH ; BIERINGER HERMANN (DE); HUFF HANS PHILIPP) 6 February 2003 (2003-02-06) claim 1 -----	1-3
X	WO 01/035741 A (FEUCHT DIETER ; BAYER AG (DE); DAHMEN PETER (DE); KREMER MATHIAS (D) 25 May 2001 (2001-05-25) example A -----	1-3
A	WO 01/074157 A (BASF AG) 11 October 2001 (2001-10-11) claim 4 -----	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

7 October 2003

Date of mailing of the international search report

06.02.04

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Authorized officer

Bertrand, F

INTERNATIONAL SEARCH REPORT

Inter application No.
PCT/EP 03/08791

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claim: INVENTION 1

synergistic herbicidal composition containing tritosulfuron and amidosulfuron

2. claims: INVENTIONS 2-53

the 52 other synergistic herbicidal compositions resulting from the combination of the 3 first components and the 27 second components (=81 combinations) minus the first invention listed above and minus the 28 exceptions listed in present claim 1.

INTERNATIONAL SEARCH REPORT

on or on patent family members

International	Application No
PCT/EP	03/08791

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 03009684	A 06-02-2003	DE 10135641 A1		06-02-2003
		WO 03009684 A2		06-02-2003
		US 2003050193 A1		13-03-2003
<hr/>				
WO 0135741	A 25-05-2001	DE 19960918 A1		23-05-2001
		AU 1029401 A		30-05-2001
		BR 0015701 A		23-07-2002
		CA 2390570 A1		25-05-2001
		CN 1391439 T		15-01-2003
		CZ 20021728 A3		16-10-2002
		WO 0135741 A2		25-05-2001
		EP 1233672 A2		28-08-2002
		HU 0203400 A2		28-03-2003
		ZA 200202759 A		09-04-2003
<hr/>				
WO 0174157	A 11-10-2001	AU 6585701 A		15-10-2001
		BG 107158 A		31-07-2003
		BR 0109821 A		21-01-2003
		CA 2404353 A1		11-10-2001
		CN 1420724 T		28-05-2003
		CZ 20023303 A3		17-09-2003
		WO 0174157 A2		11-10-2001
		EP 1267612 A1		02-01-2003
		HU 0300564 A2		28-07-2003
		JP 2003528893 T		30-09-2003
		SK 14252002 A3		03-06-2003
		US 2002028747 A1		07-03-2002
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